

Design of a Monolithic Aspherical Mirror Bender for an Active Grating

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Abstract

A novel monolithic bender was designed for an active bendable polynomial grating as shown in Fig.1. The grating was proposed to increase the resolution of the CEM design used in the Dragon type beamlines of the SRRC. The grating can eliminate the defocus and coma aberrations to yield a theoretically ultrahigh resolution. The bender was designed with an almost fixed center point after bending and a low height to fit requirements of installation. Two PZT actuators are used to bend the bender to an adjustable third-order polynomial surface profile and meet the grating adjusting range specification. After a series of FEM analyses to optimize the design, a prototype bender was fabricated and tested to achieve satisfactory results. This paper presents in detail the design and analysis processes.

Keywords: beamline, active grating, mirror bender, FEM

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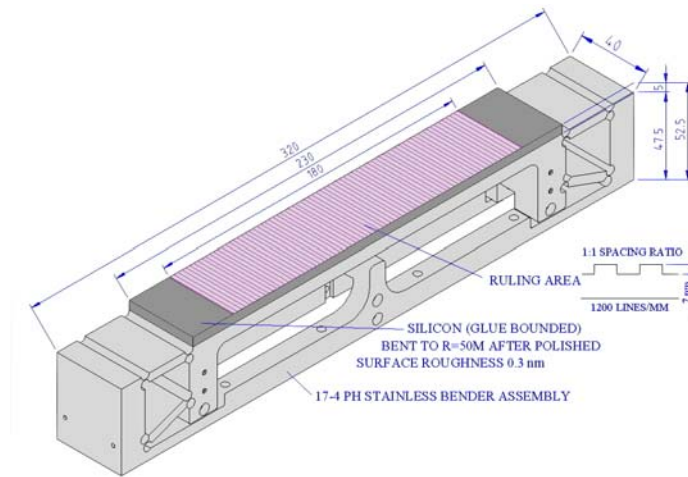


Fig. 1 A monolithic bender designed for an active bendable polynomial grating